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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,783	07/02/2003	Thomas J. La Rosa	38-21(53373)A	2839

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EXAMINER	
BUI, PHUONG T	
ART UNIT	PAPER NUMBER
1638	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/612,783	LA ROSA ET AL.	
	Examiner	Art Unit	
	Phuong T. Bui	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 9-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 9-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Office acknowledges the receipt of Applicant's Appeal Brief filed April 30, 2009. Upon further consideration, the finality of the previous Office action has been withdrawn in favor of new rejections set forth below. Any inconvenience to Applicant is regretted. Claims 1, 2 and 9-13 are pending and are examined in the instant application.

All previous rejections not set forth below have been withdrawn. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Since SEQ ID NO:3366 was first disclosed in the instant application, Applicant date of priority benefit is July 2, 2003.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 2 and 9-13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2 of copending Application No. 11/980366. Although the conflicting claims are not identical, they are not patentably distinct from each other because the sequences in claims 1-2 of 11/980366 include SEQ ID NO:3366 of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 101

4. Claims 1, 2 and 9-13 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a substantial, specific asserted utility or a well established utility.

Applicant states that the claimed invention can be used to "impart unique genetic properties into transgenic plants" (p. 6, lns. 1-2), to improve properties of interest including yield, disease resistance, growth rate, stress tolerance (p. 8, ln. 1) and all possible desirable plant traits (p. 9, lns. 9-17), and in recombinant DNA constructs, physical arrays of molecules, as plant markers and in computer based storage and analysis systems (p. 8, lns. 17-19).

The claimed invention lacks substantial, specific utility for the following reasons. SEQ ID NO: 3366 encoding SEQ ID NO:6915 was obtained from rice. Table 1 discloses SEQ ID NO:3366 encodes a cytochrome P450 protein based on sequence

alignments with prior art sequences. Since all genes will "impart unique genetic properties" when expressed in a host, the claimed invention is generic to all genes and not specific to any particular gene. Thus, these asserted uses are not deemed substantial or specific to the claimed sequence. Similarly, uses in "recombinant DNA constructs, physical arrays of molecules, as plant markers and in computer based storage and analysis systems" are generic to all genes or all plant genes and not specific to Applicant's claimed sequence. With regard to "yield, disease resistance, growth rate, stress tolerance" and all possible desirable plant properties, Applicant does not indicate which of the 12,046 sequences disclosed in the specification would impart what desirable trait(s), whether the elected sequence of SEQ ID NO:3366 encoding SEQ ID NO:6915 would impart any of these desirable traits when expressed in a plant, or how the elected sequence should be used to achieve these properties. It is unclear whether the claimed sequence should be expressed, over-expressed or suppressed from expression to, for example, render the plant disease resistant or stress tolerant. It should be noted this is a rice gene, and rice plants naturally express this sequence and do not show increased yield, disease resistance, increased growth rate or stress tolerance. Thus, it is unclear how this sequence should be used differently to achieve a property not found in rice plants already expressing this gene. With regard to its classification as a cytochrome P450 protein, this classification does not immediately impart utility because the name simply denotes a protein which has a light absorbance at a wavelength of 450 nm. There is no evidence that all proteins which absorb light at this wavelength would have the same or similar function. In fact, the state of the art

indicates P450 proteins have extremely diverse structure and function, being as low as 16% and are involve in processes including carbon assimilation, biosynthesis of hormones and structural components of living organisms, carcinogenesis and degradation of xenobiotics, chemical defense and drug metabolism (Werck-Reichhart et al., Genome Biology, Vol. 1, No. 6, 2000, pp. 3003.1-3003.9, see Abstract (Applicant's IDS)). Applicant does not teach which (if any) of these properties is possessed by Applicant's SEQ ID NO:3366 encoding SEQ ID NO:6915.

It is apparent that further research is required before the claimed polynucleotide would be of benefit to the public. However, the courts have decided that a utility which requires or constitutes carrying out further research to identify or reasonably confirm a "real world" context of use lacks substantial utility.

> "The basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. Unless and until a process is refined and developed to this point--where specific benefit exists in currently available form--there is insufficient justification for permitting an Applicant to engross what may prove to be a broad field." (*Brenner v. Manson*, 383 U.S. 519 (1966)).

Thus, while regulating certain genes for certain traits such as disease resistance and stress tolerance would provide substantial benefit to the public, the claimed invention is not refined and developed to the point where specific benefit exists, and how SEQ ID NO:3366 should be used to achieve its utility. Accordingly, the claimed invention lacks substantial and specific asserted utility.

Additionally, there is no well-established utility for SEQ ID NO:3366 and a sequence encoding SEQ ID NO:6915. SEQ ID NO:3366 does not have a well-established utility for hybridization purposes because the encoded protein does not

have utility for the reasons indicated above. Thus, for the reasons set forth, the claimed sequences lack utility (see Utility Examination Guidelines published in Federal Register/ Vol. 66, No. 4/ Friday, January 5, 2001/ Notices; p. 1092-1099).

Applicant traverses that SEQ ID NO:3366 exhibits a strong correlation to a number of cytochrome p450 family members, SEQ ID NO:6915 has 54% homology to a cytochrome *c* P450 protein, and the claimed nucleic acid sequence and polypeptide can, for example, provide defense against herbivorous insects, biosynthesis of plant growth hormones, tolerance to herbicides, and these utilities are specific and substantial. Applicant further traverses that the Office must accept a stated utility unless the Office has evidence to rebut the assertion, and one skilled in the art would be able to distinguish which of the utilities disclosed in the specification would be applicable to P450s, for example, to provide plants having improved phenotypic properties and/or improved response to stressful environmental conditions. Applicant also states members of the P450 superfamily can be further distinguished as members of a family and a subfamily, those skilled in the art would know that members of this family are involved in the gibberellin biosynthesis pathway, and P450s have a heme binding motif and common catalytic properties. Applicant further traverses the specification teaches how to increase and decrease expression of SEQ ID NO:3366, and sequences having less than 100% identity to SEQ ID NO:3366 has utility because they exhibit a reasonable correlation to a sequence encoding P450 and can also be used to isolate genes, map genes, and determine gene function associated with this protein.

Applicant's traversals have been carefully considered but are deemed unpersuasive for the following reasons. Applicant's allegation that the claimed sequence encodes a cytochrome P450 polypeptide does not immediately satisfy the utility requirements because there is no common utility for cytochrome P450 proteins.

Cytochrome P450 simply denotes proteins which absorb light at a wavelength of 450 nm. Their structures and functions are vastly diverse. The list of utilities disclosed in the specification is all possible desirable plant traits and properties for any of the 12,046 sequences, without any guidance as to which is specifically applicable to the claimed SEQ ID NO:3366 encoding SEQ ID NO:6915, or how the claimed sequences should be used to achieve any of these utilities. No utility is specifically disclosed for P450s. No utility is specifically disclosed for SEQ ID NO:3366. Applicant does not disclose which family or subfamily SEQ ID NO:3366 belongs to, or how such classification would determine utility. For example, Applicant does not disclose in the specification that SEQ ID NO:3366 is involved in the gibberellin biosynthesis pathway, how SEQ ID NO:3366 should be used to increase or decrease the level of gibberellin in a plant, or what its catalytic activity is. While one skilled in the art can readily increase or decrease the expression of SEQ ID NO:3366, Applicant provided no guidance as to what real-world benefits would be achieved from modifying the expression level. With regard to sequences having less than 100% identity to SEQ ID NO:3366, since SEQ ID NO:3366 does not have utility for the reasons set forth above, sequences having less than 100% identity would also lack utility. There is no utility in isolating and mapping genes having no known function. The function of the claimed sequences must be disclosed at filing. The utility for a sequence cannot be "to determine its function". It should be noted that no function is recited in claims 9-12. Therefore, they do not necessarily encode a cytochrome P450 protein. Thus, any utility applicable to a P450 protein as argued by Applicant would not apply to these sequences.

Accordingly, this rejection is maintained.

Claim Rejections - 35 USC § 112, first paragraph

5. Claims 1, 2 and 9-13 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a substantial, specific asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Further, with regard to claims 9-12, these claims are further not enabled because they encompass unspecified base substitutions, deletions, additions, and/or combinations thereof without any recitation of function. Assuming *arguendo* the claimed sequence confers stress tolerance or disease resistance when expressed in a plant, which has not been asserted or shown, these claims are not enabled because Applicant provided no working example or guidance as to which region(s) of SEQ ID NO:3366 should be retained, which region(s) would tolerate mutations, or how one skilled in the art can predictably and reliably make such determination without undue experimentation. While one skilled in the art can readily make mutations to SEQ ID NO:3366 or the sequence encoding SEQ ID NO:6915, further guidance is needed as to what mutations would not abrogate its function, which is undisclosed here. The claims are not limited to codon degeneracy and conservative amino acid substitutions, or even retention of any structure associated with P450 proteins. Moreover, no function is recited in any of the claims. Accordingly, Applicant has not enabled these sequences as commensurate in scope with the claims.

Applicant traverses that with regard to claims 1 and 2, the specification discloses numerous sequences, preparation of constructs, and sequence homology and percent identity evaluations; Applicant is not required to verify function of SEQ ID NO:3366 or provide guidance as to where the critical regions are; Werch-Reichhart teaches sequence identity among P450s may be less than 20% and there are only three conserved amino acids; SEQ ID NO:6915 contains two structural motifs of a P450 protein and the Cys residue which is important as a ligand to heme iron; codon degeneracy and conservative amino acid substitutions are known in the art; and "changes to the critical region of a protein should be handled with caution as to avoid influencing the activity of the protein." With regard to claims 9-12 (it would appear Applicant inadvertently included claim 13), Applicant traverses that 54% identity to two prior art P450s would allow one skilled in the art to make and use the claimed invention; an unknown sequence having 90% or greater identity to a sequence having a known function is a reasonably reliable method for predicting function of the unknown sequence; and one skilled in the art would recognize the claimed molecules are members of the P450 family.

Applicant's traversals have been carefully considered but are deemed unpersuasive for the following reasons. With regard to claims 1-2 and 13 (it would appear Applicant intended to include claim 13), Applicant's arguments are not commensurate in scope with the claims because these claims have 100% identity to SEQ ID NO:3366 and a sequence encoding SEQ ID NO:6915. Claims 1-2 and 13 are not enabled because they lack utility for the reasons indicated above. Traversals with

regard to homology, percent identity evaluations, verification of function, critical regions, conserved amino acids, structural motifs, codon degeneracy and conservative substitutions do not apply to claims 1, 2 and 13. If they are intended to apply to claims 9-12, since no function is recited in these claims, Applicant's arguments with regard to retaining its function as a P450 protein (however such function is defined) are not commensurate in scope with the claims. The sequences of claims 9-12 are not required to encode a P450 protein or retain any particular activity. The numerous sequences in the specification do not encode P450 proteins or have a common structure or function, and thus one skilled in the art would not be able to reliably predict what mutations are possible in SEQ ID NO:3366 which would not abrogate its activity based on the disclosure of these numerous sequences. If claims 9-12 were to recite "having P450 activity", given the diverse structure and function of P450 proteins, and given the fact no function is disclosed for SEQ ID NO:3366, one skilled in the art would not be able to determine which sequences within the 90-99% genus would retain the activity of SEQ ID NO:3366. The activity of sequences within the 90-99% identity cannot be determined if the activity of SEQ ID NO:3366 is not known or disclosed. Moreover, the claims are not limited to codon degeneracy changes and conservative amino acid substitutions. Absent further guidance, one skilled in the art cannot make and use the claimed invention without undue experimentation. Accordingly, this rejection is maintained.

Claim Rejections - 35 USC § 102

6. Claims 1, 2 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Barrett USPN 6380465 (A)). The recitation of "a nucleic acid sequence of SEQ ID NO:3366" and "a polypeptide" read on any portion of SEQ ID NO:3366 or a sequence encoding SEQ ID NO:6915, such as a 2-base or 6-base sequence. Barrett teaches probes, primers and any portion of a nucleotide sequence encoding a cytochrome P450 (SEQ ID NO:1). Accordingly, Barrett anticipated the claimed invention. In claim 1, it is suggested "a nucleic acid sequence of" be deleted. In claim 2, it is suggested "having an amino acid sequence" be deleted. In claims 9-13, it is suggested "a nucleic acid sequence selected from the group consisting of" be deleted.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2 and 9-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kikuchi et al. (US20060123505, filed May 29, 2003 (B)), see sequence alignment in Kikuchi et al., Database Published_Applications_NA_Main, US20060123505, SEQ ID NO:16522, see search result 2 (U)). The recitation of "a nucleic acid sequence of SEQ ID NO:3366" and "a polypeptide" read on any portion of SEQ ID NO:3366 or a sequence encoding SEQ ID NO:6915, such as a 2-base or 6-base sequence.

Additionally, Kikuchi teaches a sequence of SEQ ID NO:16522 which has 90% sequence identity to SEQ ID NO:3366, as well as probes and primers. Accordingly, Kikuchi anticipated the claimed invention.

Remarks

9. No claim is allowed.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong T. Bui whose telephone number is 571-272-0793.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Phuong T. Bui/
Primary Examiner, Art Unit 1638
7/21/09